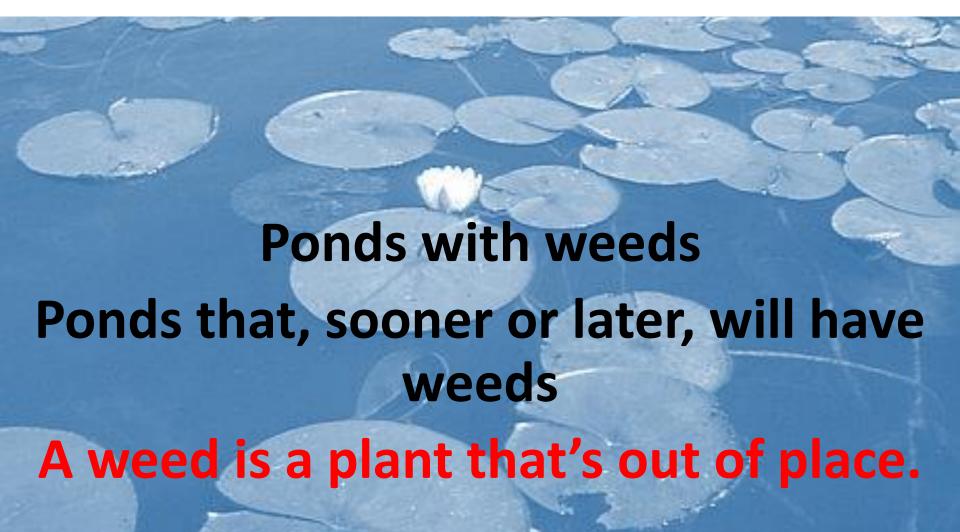




There are Two Types of Ponds



Importance of Aquatic Plant Identification

- Distinguish between desirable and undesirable species
- Assure that the proper management options are selected for the target species
- Adjust management strategy to impact the target weeds at most critical points in their life cycles and to minimize adverse impacts on non-target species

<u>Prevention</u>

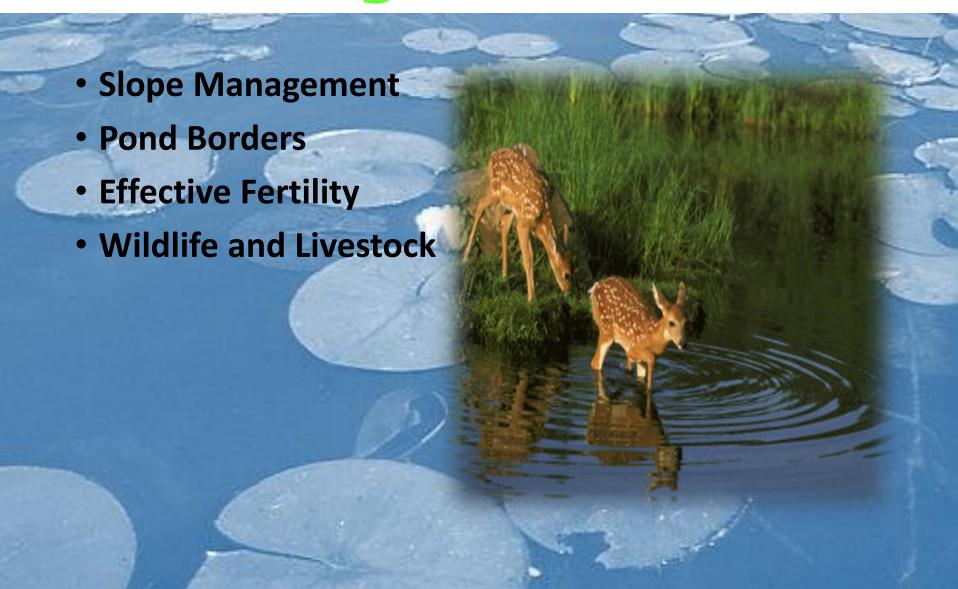
- Proper Pond Location
- Proper Pond Design and Construction
- Regular Maintenance
- Avoidance of Weed Introductions
- Avoid Excessive Nutrient Loading

Overview

- Land Management
 Practices
- Water Management Practices
- Manual Removal
- Biological Control
- Chemical Control
- Incorporating Multiple
 Practices



Land Management Practices



Water Management Practices



Pond Dye

- Lots of brand and color options
- Substitute for fertilizing
 - Great option when fertilizing is not an option.
 - Following algaecide application
 - Presence of weed problems
- Not recommended for intensively managed fisheries
 - Negatively impacts zooplankton populations







Aquatic Harvesters

Pros

- Chemical free?
- Fast removal of weeds
- Effective in most water depths

Cons

- Availability/cost
- Bycatch
- Disposal of weeds
- Fragmentation concerns





- Great option for small ponds
- Inexpensive
- Compost or mulch with harvested weeds



Biological Control

- Species Available
 - Tilapia
 - Triploid Grass Carp
 - Alligatorweed Fleabeetle
- Pros
 - Chemical free
 - Cost efficient
 - Fishery supplement
- Cons
 - Not effective on all weeds
 - Slow results
 - Permits required
 - Restocking required
 - Potential for fishery imbalance



Triploid Grass Carp

- Ctenopharyngodon idella
- Overwinter well
- 5 years of quality service
- May live 20 years and reach weights in excess of 30lbs
- Primarily feed on aquatic macrophytes
- Preferred plants include: Spikerush, Chara, Pondweeds, and Naiads







NPDES

Federal Law

- Marriage of Clean Water Act and Federal Fungicide, Insecticide, and Rodenticide Act
- EPA Regulations
- Administered by SCDHEC

Permit Requirements

- General Permit
 - Less than 200 acres or 20 miles of shoreline.

Above Thresholds

- Notice of Intent (NOI)
- Integrated Pest Management
- Pesticide Discharge Management Plan





Effective Labeled Chemistries

- 2,4-D
- Bispyribac
- Carfentrazone
- Copper
- Diquat
- Endothall
- Flumioxazin
- Fluridone

- Glyphosate
- Imazamox
- Imazapyr
- Penoxsulam
- Sodium Carbonate Peroxyhydrate
- Topramezone
- Triclopyr

Water Use Restrictions

- Herbicides may require a waiting period before treated waters may be used for various activities.
 - Irrigation
 - Fish Consumption
 - Watering Livestock
 - Swimming



Selecting the Right Herbicide

Weed Type	Effective Chemistries (Please check label, product effectiveness may vary by species.)
Algae	Copper, Diquat, Endothall, Sodium Carbonate Peroxyhydrate
Floating Plants	*Several other chemistries are effective on Water Hyacinth
Emergent Plants	2,4-D, Bispyribac, Carfentrazone, Diquat, Flumioxazin, Fluridone, Glyphosate, Imazapyr, Imazamox, Penoxsulam, and Trichlopyr
Submerged Plants	2,4-D, Carfentrazone, Diquat, Endothall, Flumioxazin, Fluridone, Penoxsulam, and Triclopyr

Chemical Control Pros and Cons

Pros

- Fast results
- Many options
- Effective
- May be only option for some species
- SAFE
- Cons
 - Chemical free movement
 - Dissolved oxygen concerns
 - Cost
 - Multiple treatments may be required



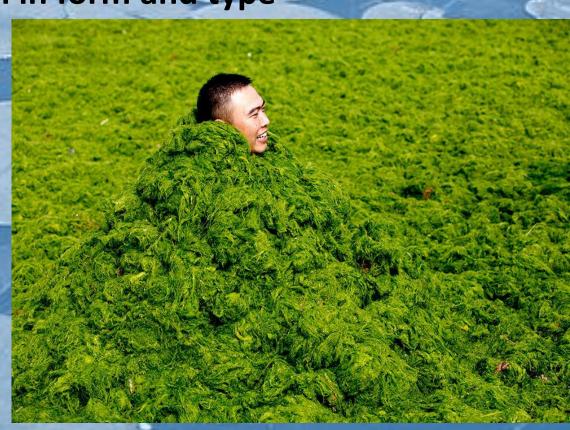
Difficult Plants to Control - Survey

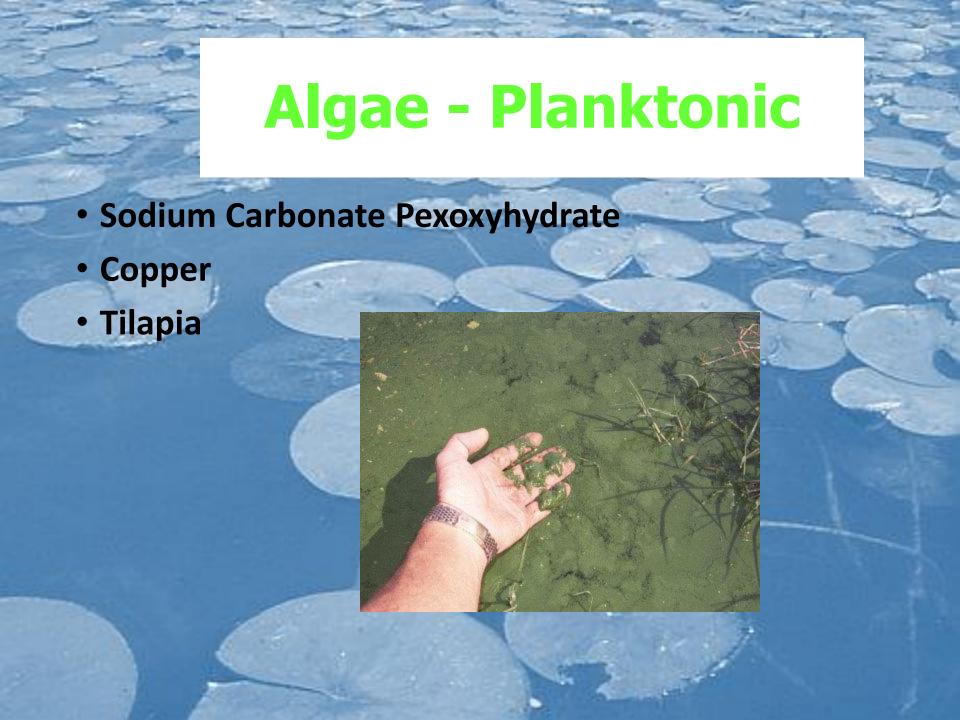
- Algae (filamentous, HABs, Chara, all)
- Widgeongrass
- Spikerush or slender spikerush
- Cattails
- Alligatorweed



Algae - (filamentous, HABs, Chara, all)

- Appear to be simple
- Very diverse both in form and type
- Nutrient-based
- Planktonic
- Single strand
- Branched
- Blue-greens







- Sodium Carbonate Pexoxyhydrate
- Copper
- Tilapia
- Easier Control



Algae – Branched

- Sodium Carbonate Pexoxyhydrate
- Copper
- Endothall
- Diquat
- Flumioxazin
- Tilapia
- Harder Control
- Chara and Nitella Grass Carp



Algae – Blue-green - Lyngbya



- Sodium Carbonate Pexoxyhydrate
- Copper
- Endothall
- Diquat
- Flumioxazin
- Tilapia
- Hardest Control



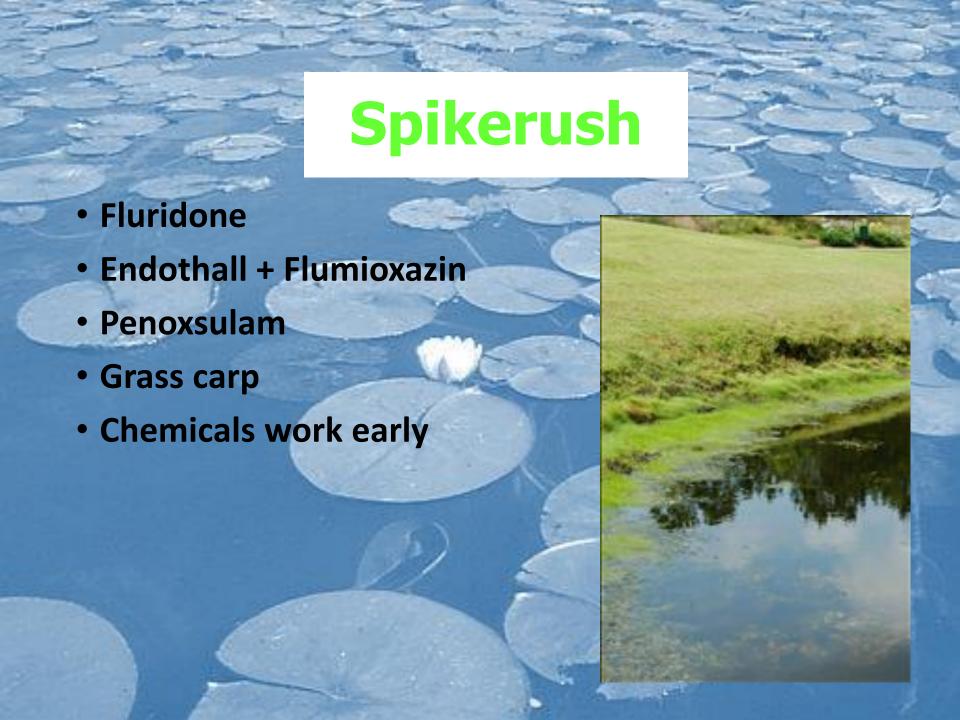
Algae Control Assistance

- Dr. John Rodgers Clemson
- Internationally recognized Algologist
- Bioassay
- Ship Sample and Water
- Charge
- 864-656-0492



Widgeongrass

- Fluridone
- Intricate Label Questions
- Flumioxazin Do not apply to intertidal or estuarine areas
- Diquat Still water minimal to no flow to public waters
- Aquathol Do not use in brackish or saltwater
- Grass carp
- Temperature
- Salinity



Cattail

- Imazapyr
- Imazamox
- Glyphosate

Control without hurting other plants – Application
 Method and Diquat

- Chemicals work best early
- Possible New Product –

Aquatic Grass Herbicide





- Imazapyr
- Triclopyr
- Imazamox
- Glyphosate
- 2,4-D
- Early Low Water Level
- Alligatorweed Flea Beetles



Other Questions on Survey

- Bacopa below water Penoxsulam
- Sago pondweed Grass carp, Fluridone, Endothall, Imazamox





Weed Management Decisions

- Plant identification
- Budget and Equipment
- Control Period Speed and Duration
- Use of the body of water (irrigation, potable water, livestock, fishing, etc.)
- Physical, environmental, and economic constraints
- Water quality
- Fish and wildlife populations (including threatened and endangered species)

Questions

- Applicator License?
- Water Use Restrictions?
- Downstream Uses?
- Ownership?
- Local Ordinances?
- SC DHEC Buffers?
- Read and Follow The Label?

• The Label Is THE LAW!!!